**Note: This is the original lesson by Parks Canada. The following adjustments still need to be made:**

**1. Put in the template.**

**2. Addition of criteria for a sound decision.**

**3. Structure so the first 2 scenarios are modeling the task but the 3rd scenario is the critical challenge.**

**TO BURN OR NOT TO BURN:**

**DECIDING WHETHER TO PUT OUT WILDFIRES IN**

**PUKASKWA NATIONAL PARK**

**Objectives:**

* To understand how humans manage actual environmental events (forest fires);
* To use a decision-making model to manage forest fires;
* To locate relevant information using a variety of primary and secondary sources;
* To work on an activity that supports curriculum expectations.

**Project Description:** A wildfire has started in Pukaskwa National Park! Using the resources provided, students will work individually, in pairs or in groups to determine whether the wildfire should be permitted to burn naturally or whether the fire should be extinguished.

**Grade and Subject:** For a complete list of grades and subjects, please go to the Teacher Resource Centre website at www.parkscanada.gc.ca/education .

**To assist you with researching this topic, visit the following websites:**

Pukaskwa National Park Fact Sheet: www.parkscanada.gc.ca/education

* keyword search “Pukaskwa”

Pukaskwa National Park’s website: www.parkscanada.gc.ca/pukaskwa

Go to the “Fire” section for information on:

* Pukaskwa’s prescribed fire program
* a 2 page fact sheet on Pukaskwa’s fire program

For additional maps, visit: Google Maps http://maps.google.com

* keyword search “Pukaskwa”

**Other Fire-Related Lesson Plans:**

*Design A Brochure For The Prescribed Fire Program At Pukaskwa National Park Of Canada*

* this lesson can be found on the Teacher Resource Centre website at www.parkscanada.gc.ca/education .

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Mike Small – Fire Management Specialist, Pukaskwa National Park

Derek Bedford – Fire Technician, Pukaskwa National Park

Susan Staple – Education Specialist, Parks Canada

**TO BURN OR NOT TO BURN:**

**flames**flames**DECIDING WHETHER TO PUT OUT WILDFIRES IN**

**PUKASKWA NATIONAL PARK**

**Pukaskwa National Park**

The only wilderness national park in Ontario, Pukaskwa National Park protects 1 878 km2 of boreal forest. The park borders Lake Superior and is the largest national park in Ontario (refer to Map #1). It is accessed by road via the Trans Canada Highway and is approximately 1 200 km northwest of Toronto and 320 km east of Thunder Bay. Hattie Cove, located in the northwest corner of the park, is the centre for most park activities and services. This includes campsites, day use areas, a visitor centre, and several hiking trails, including the start of the Coastal Hiking Trail.

*Species at risk (SAR)*

extinct, extirpated, endangered, threatened, special concern or data deficient species.

**Fire within Pukaskwa National Park**

The mandate of Pukaskwa National Park is to protect and present the natural and cultural resources within the park. Some of the important features within the park include the boreal forest; species at risk (SAR) such as woodland caribou (*Rangifer tarandus*) and the Pitcher’s thistle (*Cirsium pitcheri*); and Anishinaabe culture, history, and values.

*Fire Exclusion Policy*:

No fires are allowed, and wildfires are extinguished (put out) immediately.

One of the key natural processes for maintaining the health of the boreal forest ecosystem is fire. However, for several decades the park was under a fire exclusion policy. Much of the vegetation in the park depends on fire, therefore suppressing fires has disrupted the health and function of the park’s ecosystem. For example, recent vegetation surveys of the park reveal a forest with few young trees (less than 3% of the total area). Additionally, species dependant on fire such as jack pine have been replaced by white birch, black spruce, and balsam fir (refer to Map #2).

*Prescribed Fires*: Trained specialists decide when, where and under what limits fires will be permitted to burn. They consider weather, type of vegetation, fire behaviour, terrain and wildlife in order to burn safely and meet ecological goals.

Today park staff are working to reverse these effects by using fire to manage the park’s vegetation. This is being done through:

(1) prescribed fires and

(2) allowing some wildfires to burn.

*Wildfire:* An unplanned fire caused naturally or by humans.

**Purpose**

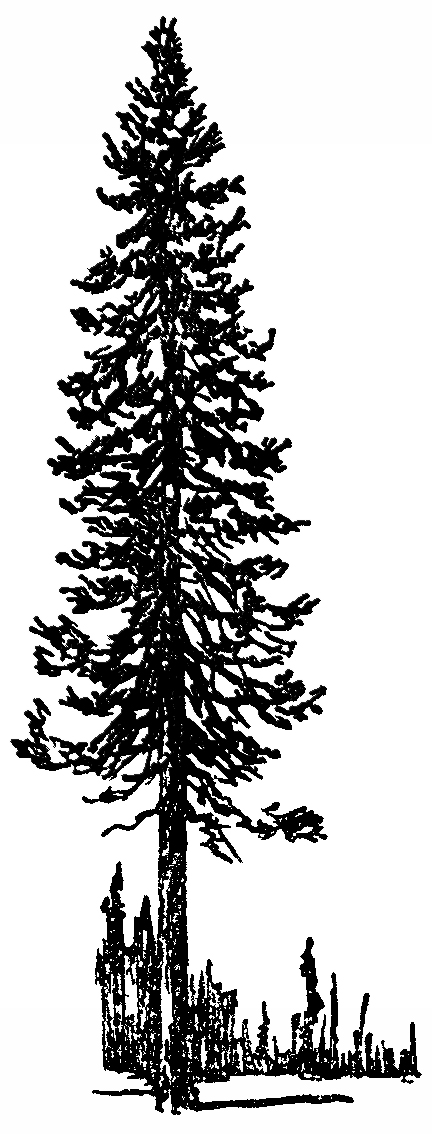
For this activity you will be assuming the role of a Fire Specialist for Pukaskwa National Park. This means you will need to make some important decisions concerning wildfires within the park. You will read the three scenarios below and use the supporting resources provided (eg. maps, websites, fact sheets, and the wildfire decision key), to explain why you would or would not allow each of these wildfires to burn to their natural end. This activity can be further extended to incorporate role play (Supervisor and Fire Management Specialist), presentation of findings, debate and/or a written memo from the Fire Management Specialist to the Supervisor advising on the recommendation to burn or not to burn.

Scenario #1 – Wildfire at Hattie Cove

A wildfire just broke out 3 km south of Hattie Cove, the park’s administrative centre and popular day-use area. The fire, ignited by a lightening strike, falls within Fire Management Zone 2. Information collected from the nearby weather station indicates that there has been no rainfall for the past five days and air temperatures have averaged 23 ºC for the past week. It is summer and the current weather forecast indicates that it will continue to be hot and dry for the next 5-7 days.

MCj02129190000[1]The predominant tree species in the area is a mix of white birch (*Betula papyrifera*), jack pine (*Pinus banksiana*), black spruce (*Picea mariana*) and white spruce (*Picea glauca*). Nearby buildings include the Administration Building at Hattie Cove. Surrounding infrastructure includes the park’s phone lines, weather station, campsites, access roads to the park, and the beginning of several hiking trails (Southern Headland Trail, Beach Trail, and the Halfway Lake Trail). It is currently peak visitor season. Approximately 3 km north of the park is the Pic River First Nation and the community of Heron Bay. The fire is not expected to directly impact the areas where these communities are located.

**Your Turn:** As the park’s Fire Specialist you will need to decide what to do next. Use the following decision-making key to help guide you through the decision-making process. Your decision should be based on the location of the wildfire, the surrounding natural and built environment, the risk to visitors, park staff and residents, and the weather conditions. You will need to answer the following question: ***Should this wildfire be extinguished or should it be allowed to burn to its natural end? Justify your answer.***

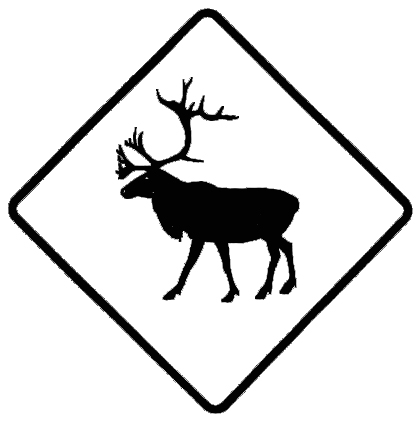


Scenario #2 – Wildfire 5 km southeast of Tip Top Mountain

A wildfire has started 5 km southeast of Tip Top Mountain in Fire Management Zone 3. The predominant tree species in the area are white birch (*Betula papyrifera*) and black spruce (*Picea mariana*). The majority of the stands are mature.

The closest weather station, at Soldier Mountain, indicates that the average air temperature for the week was 19 ºC. The short-term forecast is calling for one more day of dry weather with moderate winds from the northwest (blowing in southeast direction) followed by showers and thunderstorms. The time of year is late July. There are no buildings or services in the area.

**Your Turn:** As the park’s Fire Specialist you will need to decide what to do next. Use the following decision-making key to help guide you through the decision-making process. Your decision should be based on the location of the wildfire, the surrounding natural and built environment, the risk to visitors, park staff and residents, and the weather conditions. You will need to answer the following question: ***Should this wildfire be extinguished or should it be allowed to burn to its natural end? Justify your answer.***



*Threatened*

*Status:*

Assigned to

species likely to become endangered if negative factors are not reversed.

Scenario #3 – Wildfire 15 km east of Otter Cove

Hot dry weather conditions following a lightening storm started a wildfire 5 km east of Otter Cove. The wildfire is in Fire Management Zone 3 of the park. Winds are strong and are blowing in a westerly direction. There is an extensive buildup of understory brush which is fueling the fire. The wildfire does not pose a risk to any buildings. The forecasted weather is calling for sunny days with light winds from the southwest for the next 48hrs. The long-term forecast indicates a significant rain event is anticipated, which may drop upwards of 20-25mm of precipitation.

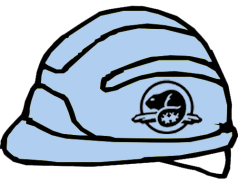
*COSEWIC:*  the committee which determines the detailed national status of wild Canadian species suspected of being at risk.

**Note:** the Otter Cove area provides important habitat for the forest-dwelling woodland caribou (*Rangifer tarandus*), a species at risk (SAR) assigned a threatened status by the National Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Woodland caribou require large areas of mature coniferous forest for their survival. Habitat fragmentation and an increase in the number of predators, such as wolves, are threatening their survival. This fire may damage or negatively impact critical caribou habitat. (For more information on the Woodland Caribou, see http://www.northernontario.org/Environment/MiscArticles\_PukaskwaPark.htm)

*Habitat Fragmentation:*

The alteration or breaking up of habitat into discrete or weakly connected islands as a result of modification to the landscape.

**Your Turn:** As the park’s Fire Specialist you will need to decide what to do next. Use the following decision-making key to help guide you through the decision-making process. Your decision should be based on the location of the wildfire, the surrounding natural and built environment, weather conditions, risks to visitors, park staff and residents and any impacts to species at risk (SAR). You will need to answer the following question: ***Should this wildfire be extinguished or should it be allowed to burn to its natural end? Justify your answer.***

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|  |  |  |
| --- | --- | --- |
| **Wildfire Decision-Making Key:** | | |
| **Question** | **Response** | **Action** |
| 1. Did the wildfire start in Fire Management Zone 2 of the park? (refer to Map #3) | Yes | Proceed to Question #3 |
| No | Proceed to Question #2 |
| 2. Did the wildfire start in Fire Management Zone 3 of the park? (refer to Map #3) | Yes | Proceed to Question #3 to determine if the wildfire is allowed to burn |
| 3. Does continued burning put any human life, important cultural or natural features (species at risk) or park facilities at risk of damage? | Yes | Extinguish wildfire immediately – human life, important values and/or property is at risk |
| No | Proceed to Question #4 |
| 4. Is the forecast predicting hot, dry and/or windy weather over the next few days? | Yes | Assess the situation. If the weather is hot and dry these conditions will fuel the fire. If the wind is blowing in the direction of park infrastructure and/or cultural, natural or human values, you will need to extinguish the front of the wildfire. |
| No | Proceed to Question #5 |
| 5. Is burning creating excessive smoke and management issues? | Yes | Assess the situation. Excessive smoke leading to reduced visibility could be a problem for visitors to the park and stakeholder values (refer to Map #1). If human health and life is at risk, the wildfire will need to be extinguished. |
| No | Wildfire permitted to burn so long as human life, park facilities, property and park values remain unthreatened. |

Scenario # \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Explanation of your decision:

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Scenario # \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Explanation of your decision:

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Scenario # \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Explanation of your decision:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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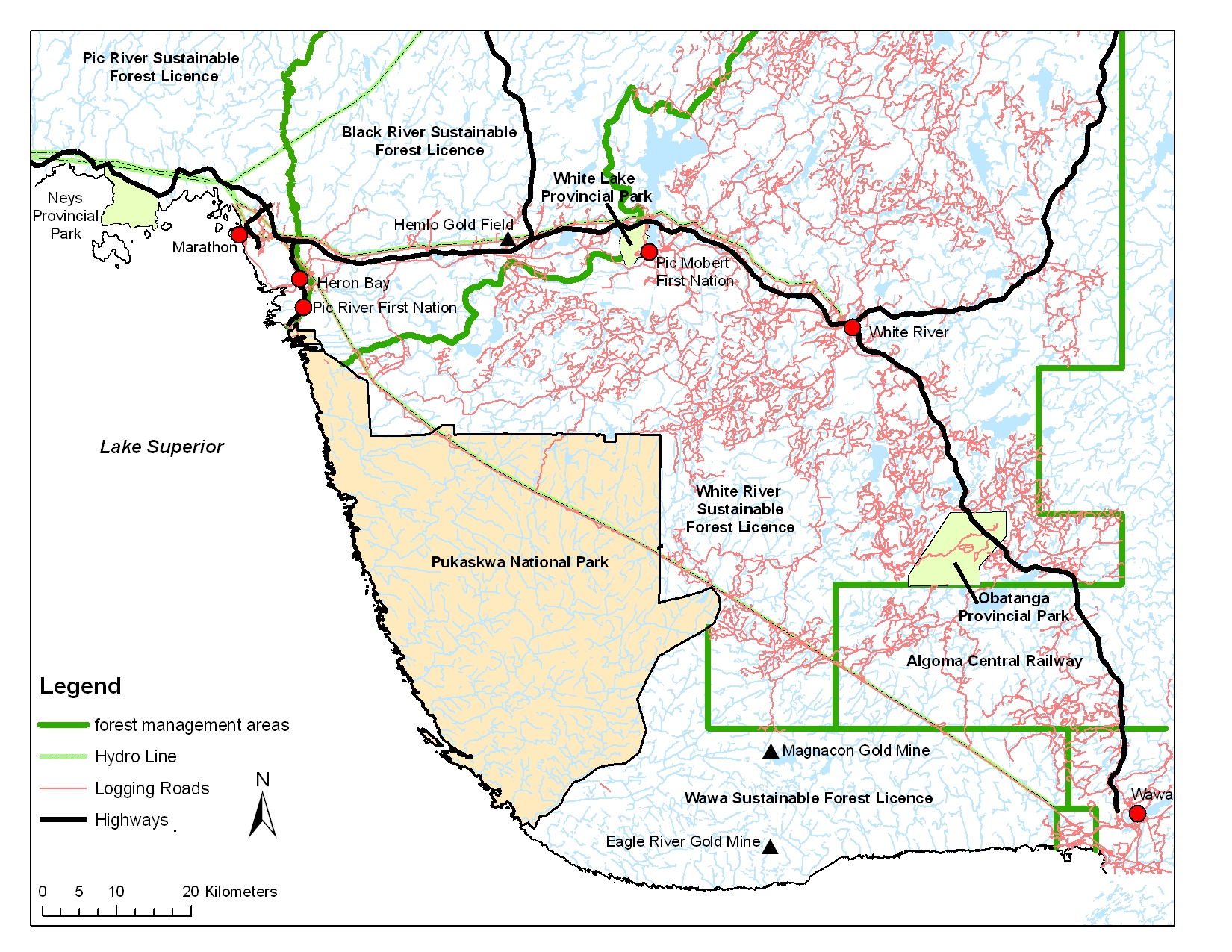
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**Map 1 Pukaskwa National Park: Stakeholder Values**

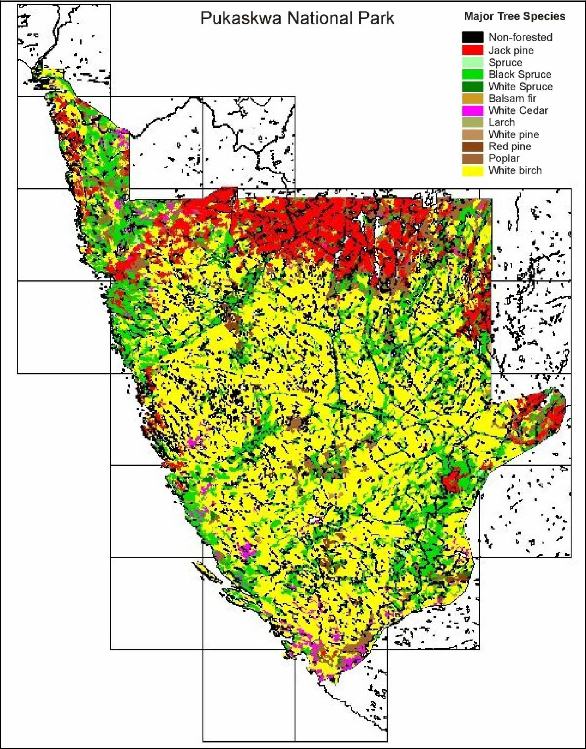
**Outside the Park**

© Parks Canada, Pukaskwa National Park, 2010



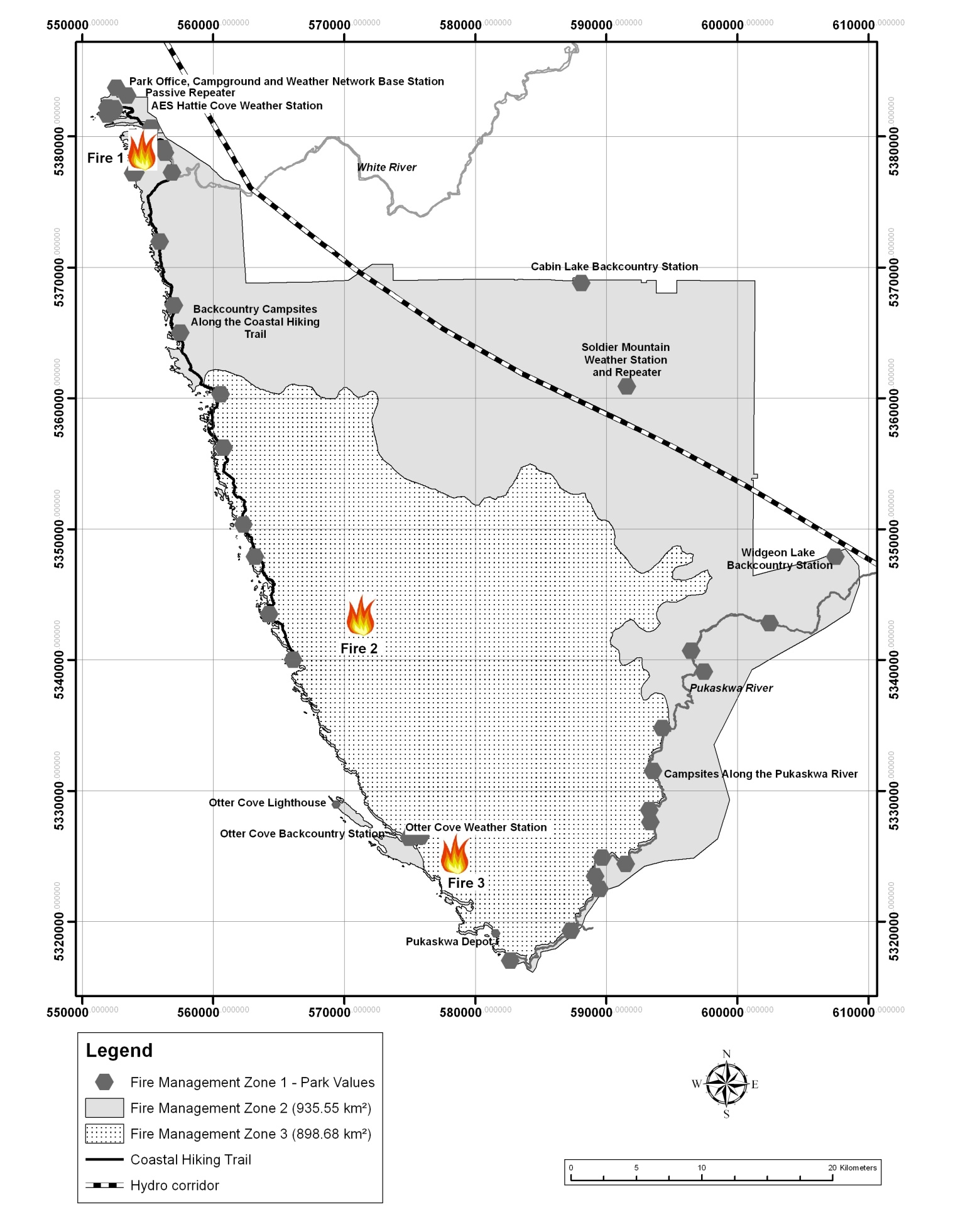
**Map 2 Pukaskwa National Park: Major Tree Species**

© Parks Canada, Pukaskwa National Park, 2010



**Map 3 Pukaskwa National Park: Wildfire Locations**

© Parks Canada, Pukaskwa National Park, 2010



***Teacher Answer Key***

Answers provided by Pukaskwa National Park’s Fire Management Specialist

**Scenario #1 – Wildfire at Hattie Cove**

**Explanation of Decision**

This wildfire should be extinguished immediately because of the threats to human life and park property values. The location of the wildfire should automatically trigger this response because of its location along the coastal hiking trail and proximity to the campground. However, the Wildfire Decision-Making Key will also support this response, as follows:

* Question #1 – The response is **Yes** and the ‘Action’ required is to proceed to Question #3.
* Question #3 – The response is **Yes** and the ‘Action’ required is to extinguish the wildfire.

Some other reasons why the fire should be extinguished include:

* Wind direction – blowing towards the Hattie Cove area.
* Previous drying trend and forecasted fire weather.
* The tree species (Pj, Bw and Sb) burning have potential for high rates of spread.

Other questions to ask Students:

* Given the current fire weather conditions, do they think the park’s fire crew would be on high alert? Answer: Yes.
* In Pukaskwa, what do they think the ratio of wildfires (lightning) to human caused fires would be? Answer: We have not had a human caused fire in Pukaskwa for over 20 years. Hikers and other park users are very responsible and are aware of the potential for escaped campfires.

**Scenario #2 – Wildfire 5 km southeast of Tip Top Mountain**

**Explanation of Decision**

This wildfire can be allowed to burn naturally because of its location (in Zone 3) and because there are no threats to park values or to the public. The Wildfire Decision-Making Key would be as follows:

* Question #1 – Response is **No** and ‘Action’ is to proceed to Question # 2.
* Question #2 – Response is **Yes** and ‘Action’ is to proceed to Question # 3.
* Question #3 – Response is **No** and ‘Action’ is to proceed to Question # 4.
* Question #4 – Response is **No** and ‘Action’ is to proceed to Question # 5.
* Question #5 – Response is **No** and ‘Action’ is to allow the wildfire to burn so long as human life, park facilities, property and park values remain unthreatened.

In this scenario the Fire Management Specialist would forecast the potential distance the fire would travel for the next 24hr period – not far enough to threaten the Zone 3 boundary. We know that the fire is travelling in a southeast direction in the interior of the park, therefore, no threats to the public. The significant incoming rain event helps with the decision to let the fire go and have nature extinguish it. After the rain event the wildfire will be monitored again to see if it is still burning, and if so, a new strategy will be developed – based on the Wildfire Decision-Making Key.

**Scenario #3 – Wildfire 15 km east of Otter Cove**

**Explanation of Decision**

This scenario can go two different directions (and has in real life too!). This scenario could create some fire vs. caribou debates for some of the young wildlife biologists and landscape ecologists in the classroom. For this exercise, there can be a few different answers. Using the Wildfire Decision-Making Key the following outcomes can be (but not limited to) as follows:

* Question #1 – Response is **No** and ‘Action’ is to proceed to Question #2.
* Question #2 – Response is **Yes** and ‘Action’ is to proceed to Question #3.
* Question #3 – If the response is **Yes** because the value threatened is the woodland caribou habitat then the ‘Action’ is to extinguish the fire immediately.
* Question #3 – If the response is **No** then the ‘Action’ is to proceed to Question #4.
* Question #4 – Response is **\*No** because there is a fire ending rain event (usually 20mm+) coming in a few days. The ‘Action’ required is to proceed to Question #5.
* Question #5 – Response is **No** then the ‘Action’ is to let the wildfire burn and continue monitoring until the situation changes (e.g. rain event doesn’t come!).
* Question #5 – If response is **Yes** because the smoke may impact the mining operations at the Magnacon Gold Mine for the next 48hrs, I’d give that student full marks!

\***No** – In this case the Fire Management Specialist would analyze the forecasted fire weather, the conditions of the forest fuels, and the topography/terrain and determine the maximum distance this wildfire can travel in 48hrs. Once the maximum distance the wildfire can spread is determined, combined with the incoming fire ending rain event, this wildfire could be monitored and allowed to self-extinguish naturally.

Note: This scenario has played out several times in Pukaskwa since 2001. Sometimes wildfires are extinguished because of the potential threat to the woodland caribou habitat (e.g. calving grounds). Other times, wildfires are allowed to burn free until naturally extinguished because they are located on hilltops and have limited natural growth potential.